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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,815	09/05/2003	Michael Paul Tankard	K315.130.101	9419
321	7590	11/29/2006	EXAMINER	
SENNIGER POWERS ONE METROPOLITAN SQUARE 16TH FLOOR ST LOUIS, MO 63102			TANG, MINH NHUT	
			ART UNIT	PAPER NUMBER
			2829	

DATE MAILED: 11/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/656,815

Applicant(s)

TANKARD ET AL.

Examiner

Minh N. Tang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 9/20/06.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on September 20, 2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Jitaru (U.S.P. 6,380,727).

As to claim 1, Jitaru discloses, in Figs. 4A-4C, a rate of change of current sensor (100) comprising a coil (coil) for coupling the flux (magnetic field) from a conductor (conductor carrying current) in which rate of change of current is to be sensed, the coil (coil) comprising a plurality of turns (12, 13), each turn (12, 13) having a first part (12) and a second part (13), the first part (12) being a track on one layer (upper layer) of a

printed circuit board (PCB) and the second part (13) being a track on another layer (bottom layer) of the printed circuit board (PCB) and connected to the first part (12) by a via (4) in the printed circuit board (PCB), each turn (12, 13) having an axis (vertical axis) being displaced from the axis (vertical axis) of its neighboring turn in a direction (lateral direction) parallel to the direction (horizontal direction) of the conductor (conductor carrying current) such that the axes (vertical axes) are displaced along a line (horizontal line) which is parallel to the direction (horizontal direction) of the conductor (conductor carrying current).

As to claims 2 and 17, Jitaru discloses in Figs. 4A-4C, the axes (vertical axes) are orthogonal to the direction (horizontal direction) of the conductor (conductor carrying current), wherein the first parts (12) define a first plane (horizontal upper plane) parallel to the direction (horizontal direction) of the conductor (conductor carrying current) and the second parts (13) define a second plane (horizontal bottom plane) parallel to the direction (horizontal direction) of the conductor (conductor carrying current), the first plane (horizontal upper plane) parallel to the second plane (horizontal bottom plane) and wherein the line (horizontal line) along which the axes (vertical axes) are displaced is parallel to the first and second planes (horizontal upper/bottom planes).

As to claim 3, Jitaru discloses in Figs. 4A-4C, the turns (12, 13) are rectangular, circular in shape.

As to claim 4, Jitaru discloses in Figs. 4A-4C, a feature (not shown) provided on the printed circuit board (PCB) to hold the conductor (conductor carrying current) in place relative to the coil (coil).

As to claim 5, Jitaru discloses in Figs. 4A-4C, the conductor (conductor carrying current) is formed on or comprises a layer of the printed circuit board (see column 1, lines 30-35).

As to claim 6, Jitaru discloses in Figs. 4A-4C, the conductor (conductor carrying current) is a split conductor having at least two limbs (i.e., two parallel conductors) each of which runs close to via (4) of either side of the coil (upper/bottom sides of the coil).

As to claim 7, Jitaru discloses in Figs. 4A-4C, two coils (coils formed by each turns 12, 13) are provided on the printed circuit board (PCB), the conductor (conductor carrying current) extending between the two coils.

As to claim 8, Jitaru discloses in Figs. 4A-4C, each turn (12, 13) of the coil (coil) is of the same dimension as the other turns (12, 13).

As to claim 9, Jitaru discloses, in Figs. 4A-4C, a switched reluctance drive including a sensor (100) comprising a coil (coil) for coupling the flux (magnetic field) from a conductor (conductor carrying current), the coil (coil) comprising a plurality of turns (12, 13), each turn (12, 13) having a first part (12) and a second part (13), the first part (12) being a track on one layer (upper layer) of a printed circuit board (PCB) and the second part (13) being a track on another layer (bottom layer) of the printed circuit board (PCB) and connected to the first part (12) by a via (4) in the printed circuit board (PCB), each turn (12, 13) having an axis (vertical axis) which is orthogonal to the direction (horizontal direction) of the conductor (conductor carrying current), each axis (vertical axis) being displaced from the axis (vertical axis) of its neighboring turn in a direction (lateral direction) parallel to the direction (horizontal direction) of the conductor

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(conductor carrying current) such that the axes (vertical axes) define a line (horizontal line) which is parallel to the direction (horizontal direction) of the conductor (conductor carrying current).

As to claim 10, Jitaru discloses in Figs. 4A-4C, the output of the sensor (100) is fed to a circuit which detects the point at which the rate of change of current crosses zero (see column 5, lines 47-58).

As to claim 11, Jitaru discloses in Figs. 4A-4C, the output of the sensor (100) is used to provide rotor position information.

As to claim 12, Jitaru discloses, in Figs. 4A-4C, a switched reluctance drive comprising at least one conductor (conductor carrying current) comprising a phase winding (conductor) for exciting two or more of the poles, and means (100) for sensing the rate of change of current in at least one phase winding (conductor), the means (100) for sensing comprising means (coil) for coupling the flux (magnetic field) from the conductor (conductor carrying current), the means (coil) for coupling comprising a plurality of turns (12, 13), each turn (12, 13) having a first part (12) and a second part (13), the first part (12) being a track on one layer (upper layer) of a printed circuit board (PCB) and the second part (13) being a track on another layer (bottom layer) of the printed circuit board (PCB) and connected to the first part (12) by a via (4) in the printed circuit board (PCB), each turn (12, 13) having an axis (vertical axis) being displaced from the axis (vertical axis) of its neighboring turn in a direction (lateral direction) parallel to the direction (horizontal direction) of the conductor (conductor carrying current) such

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that the axes (vertical axes) define a line (horizontal line) which is parallel to the direction (horizontal direction) of the conductor (conductor carrying current).

As to claim 13, Jitaru discloses in Figs. 4A-4C, the means (coil) for coupling comprises a coil.

As to claim 14, Jitaru discloses in Figs. 4A-4C, the output of the means (100) for sensing is fed to a circuit which detects the point at which the rate of change of current crosses zero (see column 5, lines 47-58).

As to claim 15, Jitaru discloses in Figs. 4A-4C, the output of the means (100) for sensing is used to provide rotor position information.

As to claim 16, Jitaru discloses in Figs. 4A-4C, each turn (12, 13) is a single wind of the coil (coil).

As to claim 18, Jitaru discloses in Figs. 4A-4C, the conductor (conductor carrying current) defines an axis (horizontal axis) along which current in the conductor (conductor carrying current) flows, the sensor (100) further comprising a plurality of vias (4) extending through the printed circuit board (PCB), said plurality of vias (4) as viewed in cross section together forming a line of vias (lateral line) extending in a direction parallel to said axis (horizontal axis).

As to claim 19, Jitaru discloses in Figs. 4A-4C, the plurality of vias (4) as viewed in cross section together form a pair of lines of vias (pair of lateral lines corresponding to left and right vias 4 in side viewed), each line of via (lateral line) extending in a direction parallel to said axis (horizontal axis).

As to claim 20, Jitaru discloses in Figs. 4A-4C, each turn (12, 13) forms a staggered overlap with adjacent turns of the coil (coil).

As to claim 21, Jitaru discloses in Figs. 4A-4C, a plurality of said vias (4) extending through the printed circuit board (PCB), the plurality of vias (4) forming a line of vias (lateral line) extending in a direction parallel to the direction (horizontal direction) of the conductor (conductor carrying current).

As to claim 22, Jitaru discloses in Figs. 4A-4C, a plurality of said vias (4) extending through the printed circuit board (PCB), the plurality of vias (4) forming a pair of lines of vias (pair of lateral lines corresponding to left and right vias 4 in side viewed), each line of vias (lateral line) extending in a direction parallel to the direction (horizontal direction) of the conductor (conductor carrying current).

As to claim 23, Jitaru discloses in Figs. 4A-4C, the conductor (conductor carrying current) is formed on of comprises a layer (see column 1, lines 30-35) of the printed circuit board (PCB) without passing through the printed circuit board (PCB).

### ***Response to Arguments***

5. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Communication***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh N. Tang whose telephone number is (571) 272-1971. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha T. Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

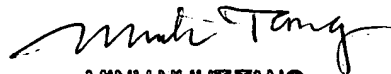
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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**MINH NHUT TANG**  
**PRIMARY EXAMINER**

11/22/06